

Section 26.2

Electric and Magnetic Fields in Space

In your textbook, read about electromagnetic waves on pages 705–708.

Circle the letter of the choice that best completes the statement.

1. A moving magnetic field produces an electric field in a process called _____.
 - a. electromagnetism
 - b. induction
 - c. magnetism
 - d. propagation
2. In 1860, James Maxwell proposed that a changing electric field produces _____ that also changes.
 - a. electromagnetic radiation
 - b. an ion
 - c. an X ray
 - d. a magnetic field
3. The speed of an electromagnetic wave is the product of the wavelength and the _____ of the wave.
 - a. velocity
 - b. magnitude
 - c. frequency
 - d. direction
4. The speed of an electromagnetic wave traveling through a _____ is always lower than the speed of an electromagnetic wave in a vacuum.
 - a. dielectric
 - b. conductor
 - c. piezoelectric
 - d. magnetic field
5. Because a vacuum has a _____ of 1.00000, the velocity of an electromagnetic wave in a vacuum is equal to c .
 - a. density
 - b. dielectric constant
 - c. electric field
 - d. radius

Answer the following questions. Use complete sentences.

6. Define *electromagnetic wave*.

7. Why does a moving magnetic field produce an electric field that is circular?

CHAPTER

26

Reinforcement

Electromagnetic Waves

You have learned that most electromagnetic waves arise from accelerated charges. The nature of the acceleration affects the frequency of the waves that are produced. The frequency of an electromagnetic wave determines its effect on matter. The table below provides information about different types of rays.

Wave	Source	Effects
radio	acceleration of electrons in an antenna	electrons in the antenna are accelerated
microwave	oscillation of charges in a resonant cavity	oscillation of electrons in molecules of food
infrared	oscillation of electrons in individual atoms	oscillation of electrons in atoms of matter
gamma rays	acceleration of charges in the nucleus of atoms	removal of charges from other atoms

- Which of these waves arises from the smallest source?

- Which of these waves arises from the largest source?

- Which of these waves creates effects on the largest scale? The smallest scale? Explain your answer.

- Describe the relationship between the source of a wave and the scale of its effects.

- What is the relationship between the frequency of a wave and the scale of its source? Why?

